EXHIBIT K

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA, SAN FRANCISCO DIVISION

IN RE SEAGATE TECHNOLOGY LLC LITIGATION CONSOLIDATED ACTION	Case No. 3:16-cv-00523-JCS **DECLARATION OF HARRIE NETEL IN SUPPORT OF SEAGATE'S OPPOSITION TO PLAINTIFFS' MOTION FOR CLASS CERTIFICATION** **Date:** March 30, 2018 **Time:** 9:30 a.m. **Place:** Courtroom G **Judge:** Hon. Joseph C. Spero Second Consolidated Amended Complaint filed: July 11, 2016

REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

DECLARATION OF HARRIE NETEL

I, Harrie Netel, declare as follows:

1. I have personal knowledge of the facts set forth herein, which are known by me to be true and correct, and if called as a witness, I could and would competently testify thereto.

2. I received my Masters in Physics from the University of Twente, The Netherlands in 1994 and my PhD in Physics from the University of Twente, The Netherlands in 1999.

3. I was employed by Lawrence Livermore National Laboratory (as a physicist) from 1994 to 1999 and then by General Electric ("G.E.") from 1999 to 2005. While at G.E., I initially worked as a physicist and later in six sigma with a focus on quality and reliability engineering for the manufacture of medical equipment, specifically, computed tomography ("CT") scanners. From 2005 to the present, I have been employed by Seagate Technology, LLC ("Seagate"). From 2005 to 2011, I worked initially as a Principal Six Sigma Master Black Belt and later as the Director of Field Quality Analytics in Seagate's Longmont, Colorado facility. In these roles, I led teams using empirical, statistical methods to measure and improve Seagate's product Quality and Reliability by identifying and removing the causes of defects in products and minimizing variability in manufacturing, the supply chain or in some cases even our customers' processes. In January 2012, I moved to China and became Director of Operations Quality and Analytics, and in August 2013 I was promoted to Senior Director Operations Quality and Analytics. While in China I was initially stationed in Suzhou, China and since January 2017 in Wuxi, China. My current role is to ensure the outgoing Quality of all Seagate's hard drives meets our customers' requirements. My current responsibilities include Supplier Quality Engineering (for incoming components), Factory Quality (for Seagate's outgoing quality control) as well as Factory and ODM Customer Technical Support.

4. Since March 2015, I have supervised Seagate's "ongoing reliability testing" or "ORT," which refers to Seagate's process of assessing and improving the ongoing reliability performance of the products shipped from Seagate's factories. ORT begins once products are approved for sale to customers. I also supervise other types of post-release testing Seagate performs, including Outgoing DPPM Testing (ODT) and Periodic Design Margin Testing (PDMT).

5. I have reviewed the documents discussed in my declaration, conferred with other employees at Seagate, and make the following statements based on my personal knowledge of Seagate's practices and procedures and the results of my review and investigation.

6. I have reviewed the declaration of Andrew Hospodor filed in support of Plaintiffs' Motion for Class Certification. In it, Mr. Hospodor reviews internal Seagate documents and states opinions that are, in many cases, clearly wrong, as explained below.

A. Background on Seagate Drive Testing

7. Seagate designs and sells drives for different environments and anticipated uses, including: "SBS" products (external, USB drives); "disty/OEM" internal hard drives; hard drives for use by businesses in commercial applications like servers, data centers, and cloud-computing and storage; and other types of specialized uses. "SBS" products are largely external, backup drives attached to computers via USB cables. These products are used for backup purposes, not for running programs or as primary data storage, and so they are typically only used for a few hours per week or per day at most. Seagate's "disty/OEM" products are internal, desktop hard drives meaning hard drives that are installed inside desktop computers. Internal hard drives usually provide the primary storage for programs and data, and so they are used more than external, USB drives, but typically not continuously (not 24/7) and not at maximum workloads. Seagate also sells "enterprise" or "mission critical" types of drives which are designed to be operated by businesses 24 hours a day 7 days a week, in high-workload applications. Seagate also manufactures and sells drives for specialized uses, like for use in "DVRs" (products like TiVo for recording TV shows).

8. That being said, Seagate did not build different ST3000DM001 drives for SBS, disty and OEM channels and it did not have separate manufacturing processes or lines for ST3000DM001 drives sold to SBS, disty and OEM. Thus, improvements made to the drives for any of these end uses were incorporated into all of the ST3000DM001 drives, and regardless of whether an ST3000DM001 drive ended up in SBS products or the disty or OEM channels, Seagate strove to make all of the drives to the highest quality.

9. Seagate employs reliability or "reliability demonstration" testing ("RDT") during at least two phases of product development: (1) in order to qualify a drive or product for production

and sale to customers; and (2) after the drive or product is qualified during ongoing reliability testing (ORT). ORT testing that occurs post-launch is meant to detect issues and drive corrective actions as the product ramps in production, and to ensure that drives manufactured at later times meet the required reliability specifications.

10. The reliability testing in ORT involves subjecting the drives to testing at high temperatures and workloads. It is a standard method for accelerating the occurrence of potential failures so that Seagate can determine how many failures are likely to occur during normal use in the field. In other words, during reliability testing, Seagate operates drives at high stress (high temperature and maximum workload) to produce much more quickly the same failures that would occur over a longer time during normal use.

11. For ORT testing, Seagate takes a sample of 100-200 of each product from the end of the production line—*i.e.*, in the same condition as they would be shipped to customers. The sample of 100-200 drives is drawn from all factories producing that product. In addition, it includes some of each size of drive (e.g., 1 terabyte (TB), 2TB and 3TB). ORT testing is done on a rolling basis. That means that a new group of drives is loaded into Seagate's testing apparatus every week, and results were assessed on a daily or weekly basis. Typical testing takes six weeks, so daily or weekly results are assessed on the entire group of drives, which is a rolling group of drives that has been in testing for varying lengths of time. Below I describe the ORT testing process employed with Grenada (including ST3000DM001) drives.

12. Grenada drives were manufactured in three sizes: 1 TB, 2 TB and 3 TB (the 3TB being the ST3000DM001 drives). For ORT testing purposes of the Grenada drives, Seagate grouped all the sizes together and reported results of all sizes together.

13. For Grenada drives that were sold as internal desktop drives (e.g., the "Barracuda" and "Desktop HDD" disty/OEM products), ORT testing was performed for 6 weeks. As explained, 100-200 drives were added into testing each week, so disty/OEM ORT testing was done on a rolling group of at least 600 drives. Test temperatures for disty/OEM and SBS ORT testing varied between 53° C and 60° C.

14. ORT testing was performed at high work-loads, meaning the drives were forced to continuously read and write large amounts of data—4-5 TB/day of data to each drive, which is 168 to 210 TB total to the drives during a standard 6 week (1008 hour or 42 day) test. The Grenada drives were rated for 55 TB/year, so our standard ORT testing subjected the drives to the equivalent of 3 to 3.8 years of use. The high temperatures to which we subjected the drives during testing (15-20° C hotter than typical field applications) further accelerated wear on the drives. This increased the coverage of our standard six-week testing to more than 3-4 years of typical wear.

15. In addition to ORT testing, Seagate also performed other types of ongoing testing on drives in production. These tests included Outgoing DPPM Testing (ODT) to ensure that drives continued to perform well when installed in different computers, and Periodic Design Margining Testing (PDMT), which involves a variety of different tests that check the reliability margin of the drives against different stresses like Temperature, Voltage, Shock, Vibration, Humidity and even Altitude.

16. For some drives, Seagate reports the results of ORT or other post-release testing to OEMs on a regular basis.

17. All of these types of tests had numerous "trigger" limits or thresholds. If any of the trigger limits were exceeded, Seagate would place a "ship hold" or "stop ship order" ("SSO"), on the product. Seagate would then determine the root cause of the issue that caused the trigger, and demonstrate that Seagate had a way to segregate bad drives or fix the problem in the production line, before lifting the ship hold.

18. One of the triggers for ORT testing was the projected MTBF (mean time between/before failure) or AFR (annualized failure rate). For ORT testing on Grenada products, projected MTBF and AFR was calculated on a rolling basis based on all the drives that were in testing at the time. For example, projected MTBF and AFR would be calculated on all 600-1,200 Grenada drives in testing at any one time, even though the amount of testing the drives had received varied from 1 to 6 weeks. The data for calculating the MTBF and AFR is the time-to-failure for each drive that failed in testing, and the total time in testing for those drives that didn't fail. This data was input into industry-standard software (Weibull++ or JMP software) for performing

reliability analysis (Weibull analysis). Using the software, Seagate performed a Maximum Likelihood Estimation ("MLE") to fit a Weibull distribution to Seagate's actual test data and estimate Beta (the shape parameter) and Eta (the scale parameter). In my experience, Maximum Likelihood Estimation is a very common method for estimating Weibull parameters from accelerated testing data. Beta and Eta were then used to calculate the projected MTBF, and AFR was calculated using expected power-on hours per year ("POH") for the product.

19. Finally, if the AFR value exceeded the trigger limit, Seagate would issue a ship hold to address any problems before continuing to ship drives. In other words, Seagate did not ship drives to customers or consumers if the ORT testing indicated the AFR was above the trigger limit for the product at issue. However, since drives were placed in ORT testing on a rolling basis, a fix might be implemented while "pre fix" drives were still in testing. Thus, "raw" AFR could continue to appear above the trigger threshold even after the fix had been implemented. In other words, the reported AFR in documents could be higher than the actual AFR of drives shipped to consumers for two reasons: (1) the reported AFR is the AFR that triggered the ship hold, but since a ship hold was issued the drives at issue were not reaching consumers, and the drives that reached consumers after the hold had an implemented fix and a lower AFR; (2) even after a fix was implemented, it could take time for the fixed drives to make their way into testing and bring down the "raw" AFR to match the AFR of drives being shipped to consumers.

20. In numerous places, Hospodor assumes or claims that Seagate 'selected,' 'assumed' or utilized a pre-selected Weibull Beta value when calculating AFR for the Grenada drives and products. This is not the case. For ORT testing of Grenada products, Seagate did not pre-select or assume a Beta value. Seagate determined the Beta value (and the AFR) from the actual test data for a specific population of drives using the method I describe above.

B. Responses to Paragraphs 84, 127-155 of the Hospodor Declaration

21. In Paragraph 84, Hospodor discusses the June 4, 2012 results of ongoing reliability testing (ORT testing) on the Grenada ***Classic*** drives. (*See* Ex. 4 [FED_SEAG0026751] at p.

26785.)[1] In this case, the ORT testing showed that the projected AFR for the Grenada Classic drives was higher than desired, and higher than the trigger. However, Seagate did not ship drives that were above the AFR trigger, and in fact, one of the documents Hospodor cites shows that the drives were under ship hold at the time. (Ex. 7 [FED_SEAG0008927 reproduced as FED_SEAG0054950].) Furthermore, as explained above and below, Seagate would have implemented fixes to reduce the AFR below the trigger limit before shipping drives and the results reported here are the "raw" AFR results that do not reflect the effect of any implemented fixes. Finally, these test results were based on an unknown number of drives, and only 535 average test hours. It is unclear that testing was complete at this time.

22. In Paragraphs 127-155 of his declaration, Hospodor discusses Engineering Change Requests ("ECRs") for the Grenada Classic drive. Hospodor claims that "a large number of post-release changes is indicative of an unstable product" and that "the number of post-release changes were staggering." He also claims that "a large number of temporary changes is indicative of quick fixes that are made to keep the production line running" and that a large number of the ECRs for the Grenada Classic drive were "temporary." None of this is correct.

23. Hospodor's discussion of ECRs might have been relevant in the 1990's but is not consistent with Seagate's modern manufacturing. The Grenada drives were manufactured at three different factories in two different countries, and reached production volumes in the tens of millions per year (*counting all sizes*). Seagate has multiple sources and suppliers for each component in order to ensure that it has enough components to support these very large volumes of production, to ensure that Seagate always has backup sources in case there are problems with quality, price or availability of parts from any one supplier, and to support factories in different countries. Manufacturing drives in these volumes at multiple factories, and with multiple sources and suppliers for each component, requires an incredibly complicated supply chain. ECRs are simply a way Seagate documents each new supplier, source or change in the supply chain. A high number of ECRs is therefore simply one measure of the complexity of the supply chain. Furthermore, it is not surprising that many ECRs occurred after Seagate first qualified the Grenada Classic drive for SBS

[1] All exhibit numbers refer to Exhibits attached to the Declaration of Liên Payne.

release in April 2011, or even after it qualified for disty/OEM release on October 18, 2011. Multiple suppliers and sources are most needed to support volume production, not initial release, so it is not unusual for qualification of suppliers and sources to continue after initial release is approved but during the ramp up of production. In addition, all parts, sources and suppliers Seagate uses are fully qualified, meaning that Seagate subjects them to appropriate testing and review ***no matter when in the process they become qualified***. For this reason, it is irrelevant whether a source or supplier is added before or after a drive is approved for initial release—they all meet the same standards.

24. I have reviewed portions of Hospodor's deposition, including the portion in which he claimed that when he worked at Quantum Corporation in the 1990's, Quantum would not qualify a source or supplier after a drive was in production. (Ex. 11 [Hospodor Depo.] at 105:15-107:16, 108:15-109:6, 233:6-234:10.) I cannot speak to whether his statements about Quantum are correct, but his statements do not reflect modern manufacturing practices with which I am familiar, and under which it is common to qualify suppliers and sources at any time in the manufacturing process. Among other things, Seagate manufactured the Grenada drive over numerous years. There is simply no way that we would have a drive in production for that long and not have to make changes, and qualify numerous sources and suppliers during the period after the drive is first approved for production. Therefore, in the period with which I am familiar with Seagate's manufacturing processes, which is 2005 to the present, we anticipate continuous ECRs even after a drive is released. As noted above, for ECRs documenting changes in the supply chain, any new parts, sources or suppliers are subject to appropriate testing. Furthermore, for every ECR, engineers with subject-matter expertise in the area affected by the ERC evaluate the potential risk associated with the ECR. Any ECR with non-zero risk, is qualified using the same ODT, ORT and/or PDMT testing that is required to qualify the original design, part or process. In other words, we extensively test the impact of any ECR that could have any risk associated with it, regardless of whether the change is made before or after a drive is approved for shipment to customers. This reduces the risk of unexpected or unintended consequences of post-launch changes to as close as possible to zero.

25. Similarly, even after initial approval for production, Seagate will continuously try to improve yields, lower costs of production, improve manufacturability and improve quality. These changes will also be reflected in ECRs. Over time the product may be modified and optimized for different uses, for inclusion in different products, for use with different peripherals or software, and to add features. All of these changes will be reflected in ECRs—all subject to the appropriate testing described above. Thus, the number of ECRs does not indicate a low quality product, but simply Seagate's ongoing optimization of product for lower cost, higher yield, higher quality, better manufacturability, different uses, changing demands, added features or other improvements, etc.

26. For all of the above reasons, the total number of ECRs (1023 according to Hospodor) is not surprising to me. The number is not particularly unusual in my experience. It is also not surprising that many may have occurred after SBS shipping approval in April 2011 and/or after disty/OEM shipping approval in October 2011.

27. I do not understand what Hospodor means when he claims in Paragraphs 130, 134 and 135 that the Grenada Classic was "unstable." If he means that the product sold to consumers was defective or low quality, he is wrong. As explained above and below, the drives sold to consumers passed rigorous and appropriate testing, and the number of ECRs does ***not*** indicate that the Grenada Classic drives that consumers purchased were defective or unreliable.

C. Response to Hospodor Paragraphs 169-175

28. In Paragraphs 169-175, Hospodor discusses "ship holds" he claims show that the drives were unreliable.

29. All of the ship holds were for Grenada Classic drives **in 2011 and 2012**.

30. Hospodor implies that Seagate shipped bad drives to consumers. This is not the case. First, ship holds exist and were triggered to stop products reaching consumers as soon as Seagate identified any potential issues. As explained above, one "trigger limit" that can cause a ship hold is the AFR trigger limit from ongoing reliability testing (ORT). If the tested drives go above the trigger limit, Seagate cannot ship the drives. A few of the ship holds Hospodor cites appear to have been caused by ORT (AFR) triggers. These show that Seagate stopped shipment of products in response to this trigger.

31. Second, Seagate could not release products from ship hold unless it had validated a method to fix the problem or sort out the drives that had the potential issue. There is slight variability in all manufactured products and their components. Seagate tests and characterizes many individual components *of each drive* during manufacturing. In many cases, data analysis of failed drives will show that the problem can be linked to a specific pattern or characteristic of a component that was recorded earlier in the manufacturing process. For example, part X might have some test value or measurement that ranges between 0.0039 and 0.0041. Later during ORT testing, we might see a failure mode and through data analysis determine that the failing drives have part X with values close to 0.0039. We can then look back to the recorded "parametric" performance and implement a "parametric sort" or a "paper sort," meaning we will pull out all drives that have part X lower than 0.004 and scrap them or fix them, while releasing the drives with "good" part X for shipment. In the case of AFR triggers, Seagate always requires fixes to be identified that bring the AFR below the trigger limit before the ship hold is lifted.

32. Third, the information and data Hospodor references is "raw," pre-fix data. As explained above, ORT testing is done for six weeks, with drives being added on a rolling basis. The reported results are "raw," pre-fix numbers. If a problem is identified and fixed, the drives in testing at that time will continue to exhibit the issue for the remainder of the test period—another 4-5 weeks (or longer). So "raw" ORT test results ***do not reflect the population of drives that is shipped to consumers***, which are the post-fix or post-sort drives.

33. In fact, the entire process of issuing ship holds and validating fixes is to prevent "bad" drives from reaching consumers. It is particularly ironic that Hospodor takes evidence of Seagate actively utilizing the ship hold process to claim that it is evidence of the very thing the process was preventing.

34. In Paragraphs 171-174, Hospodor claims that four ship holds were due to "head related" issues and one was due to "contamination." As an initial matter, as discussed below in paragraph 39, one of the ship holds Hospodor references (# KOR-0191-00) did not relate to the 3TB (ST3000DM001) drives. Next, Hospodor implies that "head related" issues and "contamination" issues are all the same type of issue. This is not the case. "Head related" failures are only related in

that they somehow involve the read-write head. However, "head related" failures could be anything from a mechanical problem with any component of the read-write head (or the system that positions the read-write head), to electrical problems in the head-related circuitry, to noisy electrical signals from the head (or problems writing data), to contamination or lubrication problems involving the head, to head crashes. This is a very broad range of entirely ***unrelated*** issues. "Contamination" is another broad group of ***unrelated*** issues. Contamination can refer to any particles or chemicals that may be introduced into the drives (1) during manufacturing or assembly (including from tools or equipment on the manufacturing line or contamination within the factories), (2) by components, or (3) from wear or chemical degradation of parts within the drives as they age. Wear-related contamination can result from mechanical wear or breakdown of parts as the drive wears, or from volatile chemicals released over time ("outgassing"). Contamination can also refer to lubricant from the surface of the disks being picked up by the read-write head and/or accumulating on portions of the disk surface. Hospodor's attempt to link all of these unrelated issues is inconsistent with how the drives work and fail.

35. Hospodor identifies one instance in which drives were apparently "downgraded" to SBS. This does not imply anything improper because any such drives were required to pass SBS testing and specifications before shipping. Certain issues (including electrical head instability, which is almost always triggered by high heat and workload) might be a concern if the drives were used for internal, desktop applications but will not be a concern if the drives are used for SBS (external, USB products with limited workloads and where Seagate designed the external enclosure and knew the drives would not be subjected to high temperatures). In some of those cases, Seagate considered downgrading drives from disty to SBS. However, Seagate always validated that the drives passed testing for SBS before shipping. (*See* Ex. 8 [FED_SEAG0055094] (noting that early in 2012, Seagate put in place a system to ensure that drives would always pass the testing for the channel (SBS, disty, OEM) that they were shipped to).) Hospodor claims that Seagate was "dumping" drives in SBS, apparently implying that Seagate was doing something bad. In fact, the drives that were actually shipped to consumers met the standards and testing for the particular product at issue. Similarly, it is extremely unusual for disty and OEM drives to be treated

differently. If Hospodor has identified one instance of this, it was almost certainly because Seagate determined that the issue was specific to OEMs.

36. [redacted]

D. Response to Hospodor Paragraphs 176-180

37. Hospodor's Paragraphs 176-180, including Figures 25-27, relate two of the ship holds from 2012 discussed above.

38. Figures 25 and 26 are from a document (Ex. 9 [FED_SEAG0009670]) reporting on the reasons for issuing ship hold KOR-0187-00, which is one of the ship holds Hospodor discusses in the prior paragraphs related to Grenada Classic drives in early 2012. These figures do indicate that the test results were above the trigger limits, but that is why the ship hold was issued. Because of the ship hold, the figures do not reflect drives that are being shipped to consumers. Rather, these figures contain raw, pre-fix information.

39. Figure 27 is from a document reporting on the reasons for issuing ship hold KOR-0191-00. As explained above, Seagate tested all sizes of the Grenada drives together, and reported data on all drive sizes as a single group unless there was a reason not to do so. In this case, a later document explains that further data analysis showed that none of the failures were in 3TB (ST3000DM001) drives. (*See* Ex. 10 [FED_SEAG0071085].) Therefore, this ship hold, and Hospodor's Paragraph 178 and Figure 27, do not relate to the drives at issue in this action.

40. In Paragraphs 179-180, Hospodor discusses the same June 4, 2012 results of ongoing reliability testing (ORT testing) on the Grenada ***Classic*** drives as he had discussed in his Paragraph

84. (*See* Ex. 4 [FED_SEAG0026751] at p. 26785.) My response is explained above in paragraph 21.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on this 5th day of January, 2018, at Cupertino, CA.

Harrie Netel